Claims

1. A method for depositing a polymeric material onto a substrate, said method comprising introducing an monomeric material in a gaseous state into a plasma deposition chamber, igniting a glow discharge within said chamber, and applying a voltage as a pulsed field, at a power of from 0.001 to 500w/m^3 for a sufficient period of time to allow a polymeric layer to form on the surface of the substrate.

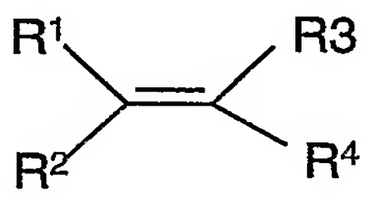
2. A method according to claim 1 wherein a plasma zone within the chamber has a volume of 0.5m^3 or more.

3. A method according to claim 1 or claim 2 wherein the power is applied at from 0.001 to 100w/m^3.

4. A method according to claim 3 wherein the power is applied at from 0.04 to 100w/m^3.

5. A method according to any one of the preceding claims wherein the monomeric material is an unsaturated organic compound which comprises a chain of carbon atoms, which are optionally substituted by halogen.

6. A method according to claim 5 wherein the monomeric material is a compound of formula (I)



(I)

where R^1, R^2 and R^3 are independently selected from hydrogen, alkyl, haloalkyl or aryl optionally substituted by halo; provided that at least one of R^1, R^2 or R^3 is hydrogen, and

R^4 is a group X-R^5 where R^5 is an alkyl or haloalkyl group and X is a bond; a group of formula $-C(O)O(CH_2)_nY-$ where n is an integer of from 1 to 10 and Y is a bond or a sulphonamide group; or a group $-(O)_pR^6(O)_q(CH_2)_t-$ where R^6 is aryl optionally substituted by halo, p is 0 or 1, q is 0 or 1 and t is 0 or an integer of from 1 to 10, provided that where q is 1, t is other than 0.

7. A method according to claim 6 wherein the compound of formula (I) is an acrylate of formula (III)

$$CH_2=CR^7C(O)O(CH_2)_nR^5 \qquad (III)$$

where n and R^5 as defined above in claim 6 and R^7 is hydrogen or C_{1-6} alkyl.

8. A method according to claim 7 wherein the acrylate of formula (III) is 1H,1H,2H,2H-heptadecafluorodecylacylate.

9. A method according to any one of the preceding claims wherein the monomeric compound in a gaseous state is supplied to the chamber in combination with a carrier gas.

10. A method according to claim 9 wherein the carrier gas is helium.

11. A method according to any one of the preceding claims wherein gaseous material is supplied to the chamber at a rate of of at least 1 standard cubic centimetre per minute (sccm).

12. A method according to any one of the preceding claims wherein vapours of compounds of formula (I) in the chamber are maintained at pressures of from 0.01 to 300 mbar.

13. A method according to any one of the preceding claims wherein the power is pulsed in a sequence in which the power is on for 20μs and off for from 1000μs to 20000μs.

14. A method according to any one of the preceding claims wherein gas is supplied to the chamber along a temperature gradient.

15. A method according to any one of the preceding claims wherein the chamber is heated during the deposition process.

16. Apparatus for depositing a polymeric material onto a substrate, said apparatus comprises a plasma deposition chamber, at least two electrodes arranged so as to ignite a plasma within the chamber, a pump system arranged to feed monomer gas into the chamber, and power control means programmed to pulse power supplied to the electrodes so as to produce a plasma at a power of from 0.001 to 500w/m^3 within a plasma zone within the chamber.

17. Apparatus according to claim 16 7 wherein the apparatus further comprises heating means for the chamber.

18. Apparatus according to claim 16 or claim 17 which further comprises a container for monomer, which is connected to the chamber.

19. Apparatus according to claim 18 wherein heating means are arranged to create an increasing temperature gradient between said container and said chamber.

20. Apparatus according to claim 16 substantially as hereinbefore described with reference to the drawings.

21. A method for depositing a polymeric material onto a substrate substantially as hereinbefore described with reference to the Example.